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Circuit for supplying oxygen to aircraft passengers

The present invention relates to circuits for supplying oxygen to aircraft passengers in case of 5 cabin decompression.

Aeronautics regulations (for example FAR) require, in commercial aircraft, the presence of an emergency oxygen system for passengers that can deliver a predetermined pure oxygen flow to each passenger 10 according to the altitude of the aircraft in case of accidental cabin decompression.

Currently available systems use a calibrated hole determining the oxygen flow rate supplied to the passenger mask, a pneumatic pressure reducer, sensitive 15 to the ambient pressure, regulating the oxygen pressure upstream of the calibrated orifices.

These purely pneumatic systems have poor accuracy and response times, giving rise to the supply of oxygen with a flow rate higher than the minimum 20 regulation flow rate required, entailing the need to carry oversized oxygen tanks, which affect the commercial performance of the aircraft.

Moreover, these systems, which require many pipes and fittings, are sources of potential leaks, and 25 demand lengthy and difficult maintenance operations.

It is the object of the present invention to propose a simple, efficient circuit for supplying oxygen, eliminating most of the above drawbacks, in particular concerning the load carried, and offering 30 greater safety.

For this purpose, according to one feature of the invention, the circuit comprises, in a line supplying oxygen connected to a pressurized oxygen source, a servocontrolled pressure regulator that can 35 be actuated in response to a pressure control signal supplied by an electronic control unit.

According to a more particular feature of the invention:

- the circuit comprises a cabin pressure sensor delivering an absolute pressure signal to the electronic control unit for the generation of the control signal of the regulator.

5 Other features and advantages of the invention will appear from the following description of one embodiment, provided for illustration but nonlimiting, in relation to the appended drawing, in which:

10 -the single figure shows schematically an oxygen supply circuit according to the invention.

The single figure shows a pressurized oxygen tank, in this case, a cylinder 1 containing oxygen under a nominal pressure of between 120 and 200 bar, provided with a pressure reducer 2 delivering oxygen at 15 a gage pressure of typically between 5 and 8 bar to a line 3, comprising a pressure regulator 4, for supplying oxygen to the crew, and at least to a line 5 supplying oxygen to the masks 6 of the cabin passengers.

20 According to one aspect of the invention, a regulation unit 7 is inserted into the line 5, essentially comprising a servocontrolled solenoid valve 8, controlled, according to external parameters, by an electronic control unit 9.

25 More precisely, the servocontrolled valve 8 is advantageously of the type of that described in document EP-A-499 505 (Arnault/Zapata), in the name of the Applicant, of which the content is incorporated here for reference, capable of regulating the pressure 30 downstream of the line 5 by following a setpoint signal 10 generated by the electronic control unit 9 particularly according to a cabin pressure signal 11 provided by an absolute pressure sensor 12, and also a regulated pressure signal 13 provided by a pressure 35 sensor 14 in the line 5 downstream of the regulator 8.

Advantageously, the valve 8 can be locked at least temporarily in the closed position, automatically and/or manually, isolating the passenger circuit to the

masks 6 in order to assign oxygen supply priority from the cylinder 2 to the crew line 3.

Depending on the choice of the aircraft manufacturer and/or operator, the electronic control unit 9 can also trigger the opening of the boxes of the passenger masks 6. Similarly, a connection 15 can be provided downstream of the regulator 8 for independently supplying oxygen to an onboard oxygen therapy system, particularly to assist patients with breathing problems.

In the embodiment shown in the figure, the unit 7 comprises a bypass line 16 provided with a safety solenoid valve 17 for shortcircuiting the regulator 8 in case of failure thereof.

As previously mentioned, the system according to the invention permits the accurate monitoring of the minimum flow rates imposed by the regulatory standards, according to the various altitudes reached by the aircraft, thereby avoiding systematic oxygen overconsumption and hence allowing the size or number of the oxygen cylinders 1, and hence their weight, to be reduced.

The system according to the invention serves to reduce the number and length of the oxygen pipes, and hence the risk of leaks, particularly in the cabin, while moreover facilitating their accommodation in the fuselage structures.

Since the connections between the sensors, the electronic control units and the regulator 8 are exclusively electrical, their monitoring and tracking are considerably easier, thereby avoiding arduous maintenance operations and particularly regular disassembly.

Although the invention has been described in relation to particular embodiments, it is not limited thereto but susceptible to modifications and variants that will appear to a person skilled in the art in the context of the claims below.